

# Technical Bulletin

## Curling



The Concrete Floor Contractors Association of Ontario was founded in 1971 to represent the concrete finishing industry.

Technical Bulletins are designed to provide state of the art information to owners, specifiers and contractors to both improve quality and reduce problems.

We hope that this information will assist you in this goal.

If you have any questions, or comments, please feel free to contact us at 905-582-9825 or by e-mail at [info@concretefloors.ca](mailto:info@concretefloors.ca)

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### Background

All concrete shrinks as it dries due to moisture loss. Concrete floors also curl upward at all interior floor joints when they dry due to temperature and humidity differences between the top and bottom of the slab (dry and warm on top versus damp and cool on the bottom). Curling occurs in all jointed, non-continuously reinforced floors and varies in amplitude based upon the shrinkage potential of the concrete and the volume of reinforcing in the slab.

### Concerns:

Fully unreinforced floors are subject to unrestrained curling and differential vertical joint movement which may create materials handling problems, tripping hazards, concern over the final appearance and problems with applied finishes.

Tolerance losses of up to 50% can occur which will significantly reduce the performance of a floor surface.

Common problems associated with curling also include cracking due to the lack of underlying support from the granular base and joint deterioration from the impact of forklift traffic.

There is no mathematic formula to predict the height of curling in a concrete floor.

While curing is essential, even well cured floors curl !

### Recommendations:

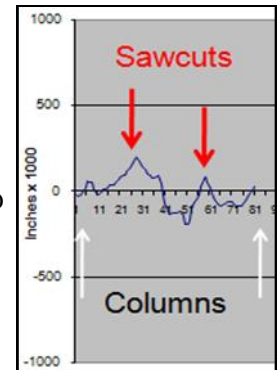
Owners should exercise caution when designing floors slabs to employ sufficient reinforcing to restrain this curling to meet their particular needs. Tolerance specifications should include an allowance for tolerance losses due to curling.

Clause 6.4.2.2.3 of CSA A23.1-04 states:

“Owners shall specify low shrinkage concrete mixes, appropriate curing, or suitable reinforcing, or a combination of these, as necessary to minimize curling to suit their intended usage.”

### Further References:

- ACI 302 Guide for Concrete Floor and Slab Construction



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